

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

(*Attorney Docket No. 14214US02*)

In the Application of:

Martin Lund

Serial No. 10/665,648

Filed: September 19, 2003

For: METHOD AND SYSTEM TO
PROVIDE BLADE SERVER LOAD
BALANCING USING SPARE LINK
BANDWIDTH

Examiner: Man U Phan

Group Art Unit: 2619

Confirmation No. 6075

Electronically Filed on October 24, 2008
FWW

APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from an Office Action mailed on November 23, 2007 ("Final Office Action"), in which claims 1-25 were finally rejected. The Applicant respectfully requests that the Board of Patent Appeals and Interferences ("Board") reverse the final rejection of claims 1-25 of the present application. The Applicant notes that this Appeal Brief is timely filed within the period for reply that ends on October 24, 2008, with a petition for five month extension and an authorization to charge the required fees.

REAL PARTY IN INTEREST
(37 C.F.R. § 41.37(c)(1)(i))

Broadcom Corporation, a corporation organized under the laws of the state of California, and having a place of business at 5300 California Avenue, Irvine, California 92617, has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefor, as set forth in the Assignment recorded at Reel 014544, Frame 0575 in the PTO Assignment Search room.

RELATED APPEALS AND INTERFERENCES
(37 C.F.R. § 41.37(c)(1)(ii))

The Appellant is unaware of any related appeals or interferences.

STATUS OF THE CLAIMS
(37 C.F.R. § 41.37(c)(1)(iii))

Claims 1-25 were finally rejected. Pending claims 1-25 are the subject of this appeal.

The present application includes claims 1-25, which are pending in the present application (See present application at pages 21-23). Claims 1-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Romero U.S. Publication No. 2004/0054780 (hereinafter, Romero), in view of Garnett U.S. Patent 7,032,037 (hereinafter, Garnett). The Applicant identifies claims 1-25 as the claims that are being appealed. The text of the pending claims is provided in the Claims Appendix.

STATUS OF AMENDMENTS
(37 C.F.R. § 41.37(c)(1)(iv))

The Applicant has not amended any claims subsequent to the final rejection of claims 1-25 mailed on November 23, 2007.

SUMMARY OF CLAIMED SUBJECT MATTER
(37 C.F.R. § 41.37(c)(1)(v))

The invention of claims 1 is illustratively described in the Specification of the present application in, for example, "Brief Summary of the Invention" section in page 4 and in Figures 1, 3, 5, 8, 10 and 12. A method and system are provided to allow blade server (e.g. 102 in Fig. 1) load balancing using spare link bandwidth (e.g. 802 in Fig. 8) in a multi-server platform (e.g. 102 to 105 in Fig. 1) having a common switch backplane (e.g. 111 in Fig. 1). See present application at page 4, lines 2-3. The method may include the steps of receiving digital information (e.g. 604 in Fig. 6) on a digital communications link (e.g. 500 in Fig. 5) at a blade server manager (e.g. 200 in Fig. 2 and steps 301 to 303 in Fig. 3). The steps may also include receiving capacity utilization information embedded in spare link bandwidth (e.g. 1002 to 1006 in Fig. 10) from a plurality of blade servers (e.g. 103-105 in Fig. 1) connected to the blade server manager (e.g. 102 in Fig. 1). The steps may further include selecting a blade server to receive the digital information based on a load balancing algorithm (e.g. step 1201 in Fig. 12), and forwarding the received information to the selected blade server. See *id.* at page 4, lines 3-8.

Claims 2-12 are dependent directly or indirectly upon claim 1.

The invention of claim 13 is illustratively described in the Specification of the present application in, for example, "Detailed Description of the Invention" section in pages 7, 20 and in Figures 1, 8 and 10. The language "a server including a blade server manager (e.g. 102 in Fig. 1), two or more blade servers (e.g. 103, 104 and 105 in Fig. 1), and a common backplane (e.g. 111 in Fig. 1); a network interface (e.g. 107 in Fig. 1) for communicating with an external network (e.g. 106 in fig. 1); and two or more blade server interfaces (e.g. 108, 109 and 110 in Fig. 1) for communicating between the blade server manager (e.g. 102 in Fig. 1) and each blade server (e.g. 103, 104 and 105 in Fig. 1)" in claim 1 is supported by, for example, paragraphs 33 to 36 at pages 7-8. Also, "wherein said blade server manager (e.g. 102 in Fig. 1) allocates data received from said external network (e.g. 106 in fig. 1) to each blade server based on embedded capacity utilization data (1002 to 1006 in Fig. 10) transmitted by each blade server (e.g. 103, 104 and 105 in Fig. 1) to the blade server manager (e.g. 102 in Fig. 1) that is embedded in spare link bandwidth (e.g. 802 to 808 in Fig. 8) on said interface (e.g. 108, 109 or 110 in Fig. 1) between the blade server manager (e.g. 102 in Fig. 1) and each of said blade servers (e.g. 103, 104 and 105 in Fig. 1)" in claim 1 is supported by, for example, paragraphs 71 to 73 at page 20.

Claims 14-25 are directly or indirectly dependent upon claim 14.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL
(37 C.F.R. § 41.37(c)(1)(vi))

Claims 1-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Romero in view of Garnett.

ARGUMENT
(37 C.F.R. § 41.37(c)(1)(vii))

The Final Office Action rejects claims 1--25 under 35 U.S.C. § 103(a) as being unpatentable over Romero, in view of Garnett. The Examiner, however, in the Final Office Action and in the 03/11/2008 Advisory Action ("Advisory Action"), fails to specifically show that the combination of Romero and Garnett discloses or suggests at least the recited limitation "**embedded capacity utilization data transmitted by each blade server to the blade server manager that is embedded in spare link bandwidth** on said interface between the blade server manager and each of said blade servers," as recited within Appellant's claims 1 and 13. The burden of establishing a *prima facie* case of obviousness resides with the Patent and Trademark Office (See *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984) quoting *In re Warner*, 379 F.2d 1011, 1016, 154 USPQ 173, 177 (CCPA 1967)). The Final Office Action fails to establish a *prima facie* case of obviousness because it does not specifically point to every limitation of the rejected claims of the present application in Romero and Garnett.

I. Rejection of Independent Claims 1 and 13 under 35 U.S.C. § 103(a)

The Appellant first turns to the rejection of claims 1 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Romero, in view of Garnett. In order for a *prima*

facie case of obviousness to be established, the Manual of Patent Examining Procedure, Rev. 6, Sep. 2007 ("MPEP") states the following:

The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007) noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Federal Circuit has stated that "rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."

See the MPEP at § 2142, citing *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), and *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval). Further, MPEP § 2143.01 states that "the mere fact that references can be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art" (citing *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007)). Additionally, if a *prima facie* case of obviousness is not established, the Applicant is under no obligation to submit evidence of nonobviousness:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

See MPEP at § 2142.

A. The Combination of Romero and Garnett Does Not Disclose or Suggest "embedded capacity utilization data transmitted by each blade server to the blade server manager that is embedded in spare link bandwidth on said interface between the blade server manager and each of said blade servers"

A(1). Arguments to Rejection of Claim 13

Regarding claim 13, the Final Office Action concedes that "Romero does not expressly disclose the capability to perform blade server load balancing functions." See the Final Office Action at page 8. In order to overcome this deficiency, the Final Office Action cites Garnett and states the following:

In the same field of endeavor, Garnett et al. (US#7,032,037) provide a server blade comprising at least one processor and at least one communications port. The communications port may be operable to receive an information message and the processor may be operable to compare the received information message to a predetermined set of possible destinations to select a destination. The communications port may be further operable to transmit the information message to the selected destination. The server blade can be configured as a field replaceable unit. This arrangement provides a load balancer module configured to take the place of a standard server blade within a modular computer system to provide a load balancing service to that modular computer system (See Figs. 1 & 15; Col. 2, lines 5 plus)

See the Final Office Action at page 8. Specifically, the Examiner relies for support on Garnett's Figs. 1 and 15, and the following citation by Garnett:

"The communications port may be operable to receive an information message and the processor may be operable to **compare the received information message to a predetermined set of possible destinations to select a destination**. The communications port may be further operable to transmit the information message to the selected destination. The server blade can be configured as a field replaceable unit. This arrangement provides a load balancer module configured to take the place of a standard server blade within a modular computer system to **provide a load balancing service to that modular computer system.**"

See Garnett at col. 2, lines 1-11 (emphasis added). The Examiner seems to equate Garnett's load balancer module 501 (see Garnett at Figs. 19A, 19B) to be the same as the claimed "blade server manager", and the servers SUR 43 (see *id* at Figs.

15 and 19B) to be the same as the claimed "blade servers". The Examiner alleges that Garnett's load balancer module 501 (i.e., the alleged "blade server manager") provides load balancing service to the servers SUR 43 (i.e., the alleged "blade servers"), which is equated to Appellant's "allocating data received based on capacity utilization data".

The Appellant respectfully disagrees and points out that Garnett, in the above citation, discloses that the load balancer module 501 (i.e., the alleged "blade server manager") provides load balancing service "by comparing the received information message to a **predetermined set of possible destinations to select a destination**". The Appellant points out that Garnett discloses that the load balancing algorithm is related to the number of active connections on each server. Specifically, the Examiner is referred to the following citation:

"A further load balancing algorithm is a least connections distribution. In this method **the load balancer monitors the number of active connections on each server**. The next connection to be load balanced is allocated to the server with the least number of active connections. The sum of active connections can be maintained either on a per service basis or for all services"

See Garnett at col. 32, lines 48-54 (emphasis added). In other words, Garnett's load balancing service is **based on a predetermined level of (server connection) destination** (i.e., SUR 43 in Garnett's Fig. 15). Garnett simply does not disclose that the servers SUR 43 SUR 43 (i.e., the alleged "blade servers") transmit data pertaining to capacity utilization to the load balancer module 501 (i.e., the alleged "blade server manager"). In this regard, Garnett's load balancing algorithm is based on information pertaining to making connections to server SUR 43 (destination), and not based on

"capacity utilization data", as alleged by the Examiner.

Therefore, the Appellant maintains that Garnett does not overcome Romero's deficiency in disclosing the claimed limitation of "blade server manager **allocates data received** from said external network to each blade server **based on embedded capacity utilization data transmitted by each blade server to the blade server manager**," as recited in claim 13 by the Appellant.

Furthermore, assuming for the sake of argument that Garnett's load balancing service is based on the alleged "capacity utilization data" (which it is not), the Appellant submits that Garnett still does not disclose or suggest "**embedded capacity utilization data transmitted by each blade server to the blade server manager** that is **embedded in spare link bandwidth on said interface** between the blade server manager and each of said blade servers," as recited in claim 1 by the Appellant. The Examiner has not provided specific citation to support the above allegation in Garnett.

The Appellant initially points out that the Examiner, in the 5/9/2007 first Office Action, the 11/23/2008 Final Office Action and in the 3/11/08 Advisory Action, did not articulate any factual support from either Romero or Garnett, to show that Romero discloses the claimed limitation "embedded capacity utilization data transmitted by each blade server to the blade server manager that is embedded in spare link bandwidth on said interface between the blade server manager and each of said blade servers," as recited in Appellant's claim 13.

The Appellant, at pages 11-14 in the 9/7/2007 response to the first Office Action,

at pages 12-14 in the 11/23/2007 response to the Final Office Action, and again at pages 2-4 in the 3/24/2008 Pre-Appeal Brief, has repeated the same argument that both Romero and Garnett are silent in the disclosure of embedding the "capacity utilization data", let alone disclosing transmitting "embedded data in spare link bandwidth on the interface between the blade server manager and each of said blade servers," as recited in claims 1 and 13 by the Appellant. In all three instances, the Appellant points out that the Examiner failed to properly respond the Appellant's argument by providing specific citation in Romero or Garnett to support the Examiner's allegation.

The Examiner is referred to (MPEP) § 2106(ii) that states "... Office personnel should state all reasons and basis for rejecting claims in the first Office action..." The Examiner is further referred to MPEP at § 2142 above, which states that "The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious... 'rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.' Furthermore, MPEP at § 2142 states:

"The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness." See MPEP at § 2142

Accordingly, based on the foregoing rational, the Appellant respectfully maintains that the Examiner has not established a prima facie case of obviousness by combining

of Romero and Garnett to disclose or suggest at least the limitation "**embedded capacity utilization data** transmitted by each blade server to the blade server manager that is **embedded in spare link bandwidth on said interface between the blade server manager and each of said blade servers**" as recited in claim 13.

Moreover, at page 2 of the Advisory Action, the Examiner has argued that Romero's flow chart in Fig. 4 illustrates a process for supporting load balancing at the blade level. Nevertheless, the Appellant points out that Romero's flow chart in Fig. 4 shows only an algorithm to determine QoS for the blade servers. Romero's flow chart in Fig. 4 **does not** mention any **interface between the server blades**, let alone disclosing or suggesting **embedding "capacity utilization information"**, and using "**spare link bandwidth**" in the interface to transmit "**embedded capacity utilization information (data) between the blade server manager and each of said blade servers**," as recited by the Appellant in claim 13.

Accordingly, the Appellant maintains that the combination of Romero and Garnett does not disclose or suggest at least the limitation of "**said blade server manager allocates data** received from said external network to each blade server **based on embedded capacity utilization data transmitted by each blade server to the blade server manager that is embedded in spare link bandwidth on said interface between the blade server manager and each of said blade servers**," as recited in the Appellant's claim 13. In this regard, the Appellant's claim 13 is sufficiently distinguishable over both Romero and Garnett, and should be allowable. The Appellant

respectfully requests that the rejection of claim 13 under 35 U.S.C. § 103(a) be withdrawn.

A(2). Arguments to Rejection of Claim 1

Independent claim 1 is similar in many respects to independent claim 13. Therefore, the Applicant submits that independent claim 1 is also allowable over the references cited in the Final Office Action at least for the reasons stated above with regard to claim 1.

Thus, at least for the reasons stated above, the Applicant respectfully submits that the Final Office Action has not established a *prima facie* case of obviousness with respect to independent claims 1 and 13.

II. Rejection of Dependent Claims 2-12 and 14-25

Based on at least the foregoing, the Applicant believes the rejection of independent claims 1 and 13 under 35 U.S.C. § 103(a) as being anticipated by the combination of Romero and Garnett has been overcome and requests that the rejection be reversed. Additionally, claims 2-12 and 14-25 depend from independent claims 1 and 13 respectively, and are, consequently, also respectfully submitted to be allowable

A. Rejection of Dependent Claims 14-15 and 2-3

At pages 6-9 of the Final Office Action, the Examiner has not provided specific citation for support to reject the limitations of the above claims. Furthermore, the Examiner is referred to Appellant's argument in section I-A(1) above, that the combination of Romero and Garnett does not disclose or suggest "embedded capacity utilization data", let alone disclosing "embedded capacity utilization data information is data representing blade server CPU percent utilization," in claim 14, "embedded capacity utilization data represents blade server interrupt utilization," in claim 15. Subsequently, the Appellant submits that claims 14-15 and 2-3 are allowable based on the above rationale.

B. Rejection of Dependent Claims 20-22 and 9-10

At pages 9-10 of the Final Office Action, the Examiner has not provided specific citation for support to reject the limitations of the above claims. Furthermore, the Examiner is referred to Appellant's argument in section I-A(1) above, that the combination of Romero and Garnett does not disclose or suggest "embedded capacity utilization data", let alone disclosing "embedded in frame alignment information," in claim 20, "the embedded capacity information is represented with at least two symbols," in claim 21 and "embedded capacity information is represented with expanded control characters," in claim 22. Subsequently, the Appellant submits that claims 20-22 and 9-10 are allowable based on the above rationale.

C. Rejection of Dependent Claims 23

At pages 6-9 of the Final Office Action, the Examiner has not provided specific citation for support to reject the limitations of the above claim. Furthermore, the Examiner is referred to Appellant's argument in section I-A(1) above, that the combination of Romero and Garnett does not disclose or suggest "embedded capacity utilization data", let alone disclosing "said load balancing algorithm utilizes said embedded capacity utilization data," in claim 20. Subsequently, the Appellant submits that claim 23 is allowable based on the above rationale.

D. Rejection of Dependent Claims 24-25

At pages 9-10 of the Final Office Action, the Examiner has not provided specific citation for support to reject the limitations of the above claims. Furthermore, the Examiner is referred to Appellant's argument in section I-A(1) above, that the combination of Romero and Garnett does not disclose or suggest "embedded capacity utilization data", let alone disclosing "said capacity utilization data is embedded in the inter packet gap," in claim 24, "said capacity utilization data is embedded in the control words bounding a data word," in claim 25. Subsequently, the Appellant submits that claims 24-25 are allowable based on the above rationale.

The Applicant also reserves the right to argue additional reasons beyond those set forth above to support the allowability of claims 1-25.

CONCLUSION

For at least the foregoing reasons, the Applicant submits that claims 1-25 are not obvious under Romero in view of Garnett. Reversal of the Examiner's rejection and issuance of a patent on the application are therefore requested.

The Commissioner is hereby authorized to charge \$540 (to cover the Brief on Appeal Fee) and any additional fees or credit any overpayment to the deposit account of McAndrews, Held & Malloy, Ltd., Account No. 13-0017.

Respectfully submitted,

Date: October 24, 2008

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CLAIMS APPENDIX
(37 C.F.R. § 41.37(c)(1)(viii))

1. A method for providing blade server load balancing using spare link bandwidth in a multi-server platform having a common backplane, comprising:
 - a. receiving digital information on a digital communications link at a blade server manager;
 - b. receiving capacity utilization information embedded in spare link bandwidth from a plurality of blade servers operably coupled to the blade server manager;
 - c. selecting a blade server to receive said digital information based on the received capacity utilization information; and
 - d. forwarding the received digital information to the selected blade server.
2. The method of claim 1, wherein said embedded capacity utilization information is data representing blade server CPU percent utilization.
3. The method of claim 1, wherein said embedded capacity utilization information is data representing blade server interrupt utilization.
4. The method of claim 1, wherein the blade server manager is operably coupled to an Ethernet network.
5. The method of claim 1, wherein the blade server manager is operably coupled to an external network.

6. The method of claim 1, wherein the blade server manager is operably coupled to an external network at a link data rate of 10 Gigabits per second.
7. The method of claim 1, wherein the blade server manager communicates with each blade server over a dedicated link.
8. The method of claim 7, wherein the data rate of the dedicated link is 1 Gigabit/second.
9. The method of claim 1, wherein the blade server utilization information is embedded in frame alignment information.
10. The method of claim 9, wherein the embedded capacity information is represented with at least two symbols.
11. The method of claim 9, wherein the embedded capacity information is represented with expanded control characters.
12. The method of claim 1 wherein the selecting is based on a load balancing algorithm.
13. A blade server with load balancing using spare link bandwidth, comprising:
 - a server including a blade server manager, two or more blade servers, and a common backplane;

a network interface for communicating with an external network; and

two or more blade server interfaces for communicating between the blade server manager and each blade server;

wherein said blade server manager allocates data received from said external network to each blade server based on embedded capacity utilization data transmitted by each blade server to the blade server manager that is embedded in spare link bandwidth on said interface between the blade server manager and each of said blade servers.

14. The system of claim 13, wherein said embedded capacity utilization data information is data representing blade server CPU percent utilization.

15. The system of claim 13, wherein said embedded capacity utilization data represents blade server interrupt utilization.

16. The system of claim 13, wherein the blade server manager is operably coupled to an Ethernet network.

17. (The system of claim 13, wherein the blade server manager is operably coupled to an external TCP/IP network.

18. The system of claim 13, wherein the blade server manager is operably coupled to an external network with a communications link having a data rate of 10 Gigabits per second.

19. The system of claim 13, wherein the blade server manager communicates with each blade server over a dedicated link having a data rate of 1 Gigabit/second.
20. The system of claim 13, wherein the blade server utilization information is embedded in frame alignment information.
21. The system of claim 13, wherein the embedded capacity information is represented with at least two symbols.
22. The system of claim 13, wherein the embedded capacity information is represented with expanded control characters.
23. The system of claim 13, wherein said blade server allocates data received from said external network to each blade server using a load balancing algorithm, and wherein said load balancing algorithm utilizes said embedded capacity utilization data.
24. The system of claim 13, wherein said capacity utilization data is embedded in the inter packet gap.
25. The system of claim 13, wherein said capacity utilization data is embedded in the control words bounding a data word.

EVIDENCE APPENDIX
(37 C.F.R. § 41.37(c)(1)(ix))

- (1) United States Publication No. 2004/0054780 ("Romero"), entered into record by the Examiner in the November 23, 2007 Final Office Action.

- (2) United States Patent No. 7,032,037 ("Garnett"), entered into record by the Examiner in the November 23, 2007 Final Office Action.

RELATED PROCEEDINGS APPENDIX

(37 C.F.R. § 41.37(c)(1)(x))

The Appellant is unaware of any related appeals or interferences.